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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR APRIL 1938

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CHIEF OF BUREAU RECEIVES ADVANCED DEGREE

On May 30 Louisiana State University conferred the honorary degree of doctor of science on Lee A. Strong, chief of this Bureau.

FRUIT INSECT INVESTIGATIONS

Gum arabic as a dispersing agent for lead arsenate spray in turf treatment.--In the treatment of turf for destruction of Japanese beetle larvae, acid lead arsenate is applied as a spray with a high-power sprayer, the spray residue on the grass being washed off with clear water immediately after its application. In order to facilitate the removal of the spray residue from the grass, tests with different dispersing agents have been made by W. E. Fleming and E. D. Burgess, of the Moorestown laboratory, in cooperation with the Divisions of Insecticide Investigations and Japanese Beetle Control. It was found that the addition of gum arabic to the spray solution in the tank at the rate of 2 pounds to 1,000 gallons of spray solution produced a much more uniform deposit on the grass, and that the deposit on the grass was removed by the washing more completely than when a dispersing agent was not used. Of the dispersing agents tried, gum arabic was the most satisfactory and its use has been recommended to the Division of Japanese Beetle Control.

More on ethylene dichloride for peach borer control.--In cooperation with the State Natural History Survey of Illinois, experiments with ethylene dichloride emulsion applied in the early spring for the control of the peach borer have just been completed in southern Illinois and Oliver I. Snapp, in charge of this work, has submitted the following summary of the results obtained from this material, as compared with paradichlorobenzene crystals. There was no preparation whatever of the soil around the trees before the ethylene dichloride emulsion was applied for these early spring experiments, and the application of that material was made by merely pouring the dose on the soil around the base of the tree and on the lower part of the trunk, from a half-pint tin cup, covering the treated surface with a little soil. The results of these experiments show that ethylene dichloride emulsion is about as effective against the peach borer when applied early in the spring as at any other season of the year, and it gave excellent control of the insect at a time when paradichlorobenzene crystals gave practically no control, because of low soil temperatures. Ethylene dichloride emulsion is safer than paradichlorobenzene for use on peach trees, especially on young trees, and is somewhat cheaper and easier to apply, in addition to its effectiveness at times when paradichlorobenzene crystals give poor results.

Demonstration of shade cloth for control of dried-fruit insects.--A test of the effectiveness of shade-cloth protection over drying peaches was made in 1937 by the Dried Fruit Association of California and the Extension Service of the College of Agriculture, University of California, cooperating. The cloth was furnished by the Agricultural Adjustment Administration as a part of the program for developing new outlets for cotton. The Fresno laboratory of the Bureau took part in planning the demonstration and H. C. Donohoe supervised the examination of samples. About 265 sheets of cloth, 27 by 28 feet, were distributed to 76 growers in 14 counties. Acceptable samples were submitted by 76 percent of the growers. The samples of peaches that had been dried on stacked trays without protection averaged 45.2 percent infested by the raisin moth (*Ephestia figulilella* Greg.), whereas the infestation of peaches that had been protected by shade cloth was 8.7 percent.

MEXICAN FRUIT FLY CONTROL

Populations lower than in 1937.--Larval infestations were found on 217 premises during February, March, and April. This was a reduction of 845 infestations from the total for 1936-37. The fly population also showed a marked decrease. In 1937 at the end of April 3,795 flies had been trapped, whereas for the same period this season only 310 specimens had been taken. The annual clean-up of fruit missed by the harvesters will start on May 2. The numbers of adults and larvae identified in April (*Anastrepha ludens* Loew) are shown in the following table.

Location	Specimens	Premises	Collections
Adults trapped			
Valley----------	214	96	--
Laredo----------	3	3	--
Adults from cages			
Valley----------	69	--	22
Larval infestations			
Valley----------	--	79	79

The harvesting season for citrus in the Rio Grande Valley of Texas closed at midnight, April 30. Total production was almost the same as for last year, namely, approximately 30,700 equivalent carloads.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Personnel changes.--W. B. Cartwright, formerly in charge of the Sacramento, Calif., laboratory, has been transferred to Lafayette, Ind., for the purpose of taking over the coordination of all the research work on the hessian fly now being carried on by this Division. Mr. Cartwright has been relieved of administrative duties so that his entire time will be available for the coordination and prosecution of hessian fly work. By this means, it is hoped to make our cooperative investigations on the control of hessian fly more effective than heretofore. P. Luginbill has been placed in administrative charge of the Lafayette laboratory and L. G. Jones is now in charge of the Sacramento, Calif., laboratory.

JAPANESE BEETLE CONTROL

Early gypsy moth hatch.--District inspectors in the New England States report that for the first time in many years hatching of gypsy moth eggs was observed in April. The unusually early hatch is attributed to periods of above-normal temperatures in March and April, reaching 89° F. in one instance. On April 27 hatching was observed in the following towns: Pomfret, Conn.; Keene, N. H.; Holliston, Greenfield, and Westfield, Mass.; and Cranston, R. I. Other hatches noted late in the month were in the towns of Stonington, Conn.; Rochester, N. H.; Stoughton, Mass.; and Putney and Westerly, R. I.

Gypsy moth egg clusters removed during inspection.--Among shipments inspected during April were 13 from which gypsy moth egg clusters were removed. The most heavily infested shipments were carloads of lumber inspected at Deering Junction, Maine, and at Rochester, N. H., destined to Niagara Falls and Garden City, N. Y. The first shipment yielded 5 egg clusters, the latter 10, and in all, 26 egg clusters were removed by the district inspectors.

Bureau field stations cooperate in determining Japanese beetle spread.--Arrangements have been made with the several divisional leaders for the operation of a dozen Japanese beetle traps in the vicinity of each field station of the Bureau throughout the United States. Where there are several divisional field stations in a single locality, one of the stations has been selected for the cooperative trapping work. Approximately 125 field stations will receive these traps. Brief instructions for assembly and operation of the traps are sent to each station head. All specimens caught in the traps are to be forwarded to the Bloomfield, N. J., field headquarters for identification. The first traps to be placed in the field were set on April 12 at Fort Myers, Fla., Las Cruces, N. Mex., and Fabens, Tex.

Methyl bromide approved as Japanese beetle fumigant for potatoes in refrigerator cars.--Administrative instructions approved on April 30 authorize the fumigation of potatoes in dry refrigerator cars with methyl bromide at a dosage of 2 pounds per 1,000 cubic feet of space, including the space occupied by the potatoes and the bunkers of the cars. A 2-hour fumigation period at a minimum temperature of 70° F. is provided. Circulation of the gas-air mixture is required. Determination by the Division of Control Investigations that such treatment is effective against the Japanese beetle is a boon to potato shippers on the Eastern Shores of Maryland and Virginia, as it will permit fumigation of the loaded cars at Wilmington, Del., and Philadelphia, Pa., the principal diversion points, thereby eliminating the prefumigation of all refrigerator cars moved into the Eastern Shore during the potato-shipping season. At a meeting held at Onley, Va., on April 25, attended by farmers, shippers, railroad officials, Virginia State representatives, and members of the Divisional staff, it was unanimously agreed that all refrigerator cars loaded with potatoes destined to nonregulated territory would be fumigated at the diversion point; also, that refrigerator cars to be used in transporting beans and other quarantined farm products would be protected by screens while being prefumigated and loaded.

Soil treatments at isolated Japanese beetle infestations.--Application of lead arsenate at Japanese beetle infestations outside the recently extended regulated territory began for the year at Atlanta, Ga., on April 5. Treatment of 17.8 acres in the Druid Hills section of the city was completed on April 16. At South Bend, Ind., 37.1 acres were sprayed with the insecticide between April 12 and 27. Soil treatments were started in Rochester, N. Y., on April 18, and in Erie, Pa., on April 25. Approximately 70 acres will be treated in Rochester and approximately 36 acres in Erie. One of the Division's spray trucks left the New Cumberland, Pa., warehouse on April 28 for Charlottesville, Va., to assist in a small soil-treating project there. In each instance, these control programs are sponsored by the State, city, or other agency, and this Bureau merely furnishes the spray equipment and men for its operation and supervision.

Gum arabic improves lead arsenate spray for Japanese beetle in soil.--At the suggestion of the Division of Fruit Insect Investigations, the usual formula for lead arsenate soil spray--1 pound of lead arsenate to a gallon of water--has been modified by the addition of 2 pounds of gum arabic (cleaned amber sorts) to 1,000 pounds of the spray solution. Field trials with this material are being made to check on the investigational work, which indicates that the addition of gum arabic produces mixtures that tend to remain in suspension for a longer period of time than does acid lead arsenate alone. This mixture reduces the amount of spray residue on the blades of grass and on the ground and significantly increases the effectiveness of the treatment in killing Japanese beetle larvae in the soil. Reduction in the spray residue decreases the amount of clear water necessary to wash in the spray solution. Field treatments with this material are being made in connection with the soil treatments now in progress in Erie, Pa., and Rochester, N. Y.

Valve controls modified on dual-tanked spray trucks.--Several of the Division's spray trucks equipped with two tank compartments, to permit continuous operation by the preparation of one tankful of solution while the other is being emptied, have been further adapted to the soil-treatment work by the installation of independent valves on each compartment. This makes it possible to pump lead arsenate through a hose line and to shift valves immediately so that clear water may be pumped through the same hose lines to wash in the lead arsenate spray. This adaptation makes it possible to complete small spray jobs at isolated points more economically than when the spraying and washing operations are performed in successive loadings of both tanks. A single outfit of this type will cover a minimum of 1 acre per day. Tanks with the new valve action were used at Atlanta, Ga.

Survey of newly regulated Japanese beetle area.--Surveys were about completed by April 30 of all nursery and greenhouse establishments in the area included in the Japanese beetle regulated zone with the extension of area effective April 11. Post offices, express agencies, and freight stations were visited and supplied with copies of revised regulations.

Selective elm sanitation in Connecticut.--Selective elm sanitation, comprising in some instances clear-cutting of elms on estates or small properties and in others removal of all elms of low vitality, was started in Fairfield County, Conn., the middle of April. The work will be confined to the vicinity of the first confirmations of 1937 in the towns of Redding and Weston, and in small swamp concentrations in the center of the most heavily infected zones in Greenwich and Stamford. Clear-cutting of chemically injected trees at Branford was started as soon as sanitation crews completed removal of dead and dying trees in New Haven County.

Increase in Dutch elm disease personnel.--During April, the W. P. A. personnel was increased from 1,496 to 2,242. New men were referred for interview on April 4 and 5 by the Connecticut W. P. A. headquarters and were immediately assigned to work. In New Haven the number of eligible men referred exceeded the number requisitioned. Difficulty was initially experienced in filling the New York quota of 631 men. Later the W. P. A. district office was authorized to assign single men that were available through local welfare agencies. Personnel in Indianapolis, Ind., was increased by the employment of 14 men on regular funds.

Health-test crews on watershed.--Three Dutch elm disease sanitation crews in Passaic County, N. J., composed of men who had qualified in a "Widal-test," were assigned to dead- and dying-tree scouting and removal work on Newark watershed property. Blanket approval has been granted for removal of all devitalized elms on this extensive tract.

April Dutch elm disease confirmations.--Laboratory reports were received during the month covering 35 confirmations and 4,005 miscellaneous cases. The laboratory received 2,215 samples submitted by the several States, as follows: Connecticut, 716; New Jersey, 574; New York, 496; States outside the major infected area, 429.

Tree-medication tests.--In cooperation with the Morristown, N. J., laboratory of the Division of Forest Pathology, Bureau of Plant Industry, 859 elms with an average d.b.h. of 9.19 inches were injected with zinc chloride to determine the suitability of this chemical as a killing agent and elm bark beetle repellent.

Athens, Ohio, elm sanitation program resumed.--Sanitation activities in the area surrounding the single Dutch elm disease confirmation at Athens, Ohio, were resumed on April 18, with a personnel of 3 appointed and 14 per diem workers.

FOREST INSECTS

Study plots on old forest fire area reexamined.--The last week in April, F. P. Keen, of the Portland, Oreg., forest-insect laboratory, assisted a group of foresters in reexaming sample plots established on the Deschutes National Forest of Oregon in 1916 following a 10,000-acre forest fire in ponderosa pine of August 29, 1915. Subsequent losses from bark beetles and wind throw, tree growth, forage, and reproduction conditions were studied on three plots representing heavy, medium, and light burn. Insects have played an important part in determining subsequent losses, both on the burn and in adjoining unburned stands.

Douglas fir beetle complicates selective logging of Douglas fir.--In 1936 a light selective cutting of Douglas fir was combined with salvage of wind-thrown timber near Cushman Lake, on the Olympic National Forest. The total stand including the down trees on the area amounted to about 10 million board feet. Subsequent to the wind throw, which occurred in the winter of 1934-35, *Dendroctonus pseudotsugae* Hopk. attacked and developed one generation in the wind-thrown trees, according to R. L. Furniss, Portland, Oreg. In 1936 the progeny from this attack emerged and attacked numerous reserve trees that were left in the selective-cutting area. Mortality was greatest where the heaviest cut (about 50 percent) has been made. As a result of the killing, it was necessary to reenter the area in 1937 and salvage the insect-killed trees. On April 15, 1938, an examination disclosed the fact that it will be necessary to repeat the salvage operation. Most of the trees that are now dead were attacked in 1936 but had not turned color sufficiently to be noticeable last year.

University students visit forest-insect laboratory.--On April 30, 1938, the forest pathology class from the University of Idaho at Moscow, comprising 43 students, visited the forest-insect laboratory at Coeur d'Alene, Idaho. The morning was spent in viewing the insect collections, insect work, and the station experimental equipment, which had been arranged in three exhibits, each in charge of and explained by a member of the laboratory staff. In the afternoon the high-school auditorium was used for a series of illustrated lectures depicting the work of the laboratory. In addition to the university students, three of the high-school biology classes, numbering about 90, attended the lectures.

Spruce budworm hibernates in pitch pockets of ponderosa pine.--J. A. Beal, of the Fort Collins, Colo., laboratory, reports that a recent search for hibernating larvae of *Cacoecia fumiferana* Clem. on infested ponderosa pine revealed the fact that a large percentage of these larvae construct their hibernacula in the dried "pitch pockets" in the bark of larger limbs and upper portions of the trunks of the trees. Although the larvae also construct their hibernacula beneath the bark scales and in bark cracks of ponderosa pine, the larger number found in the dried "pitch pockets" indicated their preference for these places. These so-called "pitch pockets" are numerous tiny cells or pockets scattered throughout ponderosa pine bark and may or may not be filled with resin. Many of them, especially near the bark surface, appear to dry out, thus leaving empty pockets in which single larvae hibernate.

Bark beetle control project under way in Denver mountain parks. According to Mr. Beal, the W. P. A. project for control of the Black Hills beetle (*Dendroctonus ponderosae* Hopk.) in the Denver mountain parks area has been approved and field work was started about April 25. The W. P. A. office has assigned 200 men to the project and a continuous force of 100 men will be kept on the work. Over 3,000 infested trees will have been treated by W. P. A. labor by June 30. The infested area has been subdivided so that the United States Forest Service will treat about 2,000 trees, using 75 C. C. C. employees, and the National Park Service will also treat about 2,000 trees, with an equal number of C. C. C. men. All work on this project has been coordinated by agreement of the above agencies through the efforts of the State entomologist's office and the Fort Collins forest-insect laboratory.

New sawfly on pine in New Jersey.--C. L. Griswold, Morristown, N. J., first found a sawfly attacking white pine in Morristown and Somerville, N. J., in 1936. In 1937 the insect was brought to the attention of the laboratory by a member of the New Jersey Department of Agriculture, who found it causing noticeable defoliation on red pine in Oakland Township. The species has recently been determined as Acantholyda erythrocephala L. by Grace Sandhouse, of the Division of Insect Identification. It is said to be widely distributed in Europe, also present in Chosen and Japan, and to attack various species of pine, as well as spruce, fir, and larch. The first, and apparently the only previous record of the species in North America, is from Chestnut Hill, Pa., where two males were taken in 1925. Besides the localities mentioned, Mr. Griswold has taken A. erythrocephala in Convent, Mahwah, Bernardsville, Springfield, and Mountain View, N. J. In northern New Jersey the species appears to have but one generation a year. The eggs are laid late in April and early in May, deposited in rows of from three to eight along the flattened surfaces of the needles. The larvae hatch early in May and feed on the older needles, inclosing themselves in frass-covered webs along the stems whose needles they are eating. Frequently the larvae are so numerous that all old needles are eaten before the larvae reach full growth. In such cases the new needles are attacked also. The larvae become full grown during the first half of June. They then enter the soil to a depth of 2 or 3 inches and hibernate as larvae within an earthen cell. Pupation occurs late in March and early in April and the adults issue in April, the males appearing earlier than the females. Infestations found in New Jersey up to the present have, with one exception, been limited to isolated trees. The exception is the infestation found in Oakland Township, where about 1½ acres were defoliated. Observations indicate that the adults exhibit a marked tendency to lay their eggs on trees upon which they fed as larvae.

Hatching of sawfly eggs.--J. V. Schaffner, Jr., of the New Haven, Conn., laboratory, reports that sawfly eggs of Neodiprion sp. on red pine collected at Groton, Mass., on April 14 began to hatch on April 19. Hatching of eggs of Neodiprion sertifer Geoffr. was nearly complete on April 25 at Far Hills and Lamington, in Somerset County, N. J.

Gypsy moth studies under way.--Henry A. Bess, New Haven, reports that detailed field studies will be conducted during May and June at Petersham, Mass., and Eastford, Conn., in connection with the ecological investigations of the gypsy moth. Eggs of the gypsy moth started hatching in Petersham, Mass., about 1 week earlier than in 1937.

Observations on Matsucoccus scale insect.--Thaddeus J. Parr, New Haven, reported that the first hatching of overwintered Matsucoccus eggs was noted on pitch pine in the field on April 25 at Plainville, Conn. Egg masses were immediately placed in a refrigerator to be held for transfer to other species of pine to determine susceptibility of other species to Matsucoccus attack. An inspection of the Matsucoccus infestations at Mont Alto, Pa., was made on April 27-29. On April 30 an inspection of the Paradise Furnace C. C. C. camp plantation infestation in Huntingdon County, Pa., was made.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Gypsy moth work adapted to variable conditions in April.--During April working conditions in the territory infested by the gypsy moth were extremely variable, ranging from winter storms to summer heat. On April 6 the most severe storm of the winter covered the ground with from 4 to 7 inches of wet snow in Pennsylvania. No scouting work could be done in the New England States on April 7 and 8, because of snow and rain which froze to the trees on the high elevations and made traveling hazardous. The snow and ice quickly melted and by the end of the following week even the dirt roads were in reasonably good condition, except in the mountainous sections north of Rutland, Vt. On April 29 a brief but severe hailstorm occurred in the vicinity of Danby and Rutland, Vt., and the huge hailstones caused considerable damage to tree growth by knocking off twigs and developing buds. However, except for this local disturbance, warm clear weather was usual over the entire territory during the latter part of the month.

Gypsy moth eggs hatching earlier than usual.--Gypsy moth eggs deposited on a fruit tree in the village of Inkerman, Jenkins Township, Pa., hatched on April 18. Additional reports of emerging larvae were received the following week from Pennsylvania and Connecticut. The early records are made by egg clusters deposited in sheltered spots that are fully exposed to the rays of the sun, and they hatch several days in advance of the clusters deposited in less favorable locations. The first emergence of larvae noted in the Pennsylvania area during the fiscal year 1937 occurred on May 4, indicating that development is somewhat earlier this year.

Weather stations established in three States.--Weather stations were set up about the middle of April in Westfield, Mass.; Rutland, Vt.; and Berlin and Milan, N. Y. As has been the custom during recent years, the machines will be operated until about the first of June so that records of temperature, wind velocity, and wind direction may be studied and correlated with the probable dispersion of young gypsy moth larvae by the wind.

Experiments in tree marking by gypsy moth scouts.--Trees examined by gypsy moth scouts are marked so that there will be no repetition of work by members of the crew and the work can be checked by foremen, supervisors, trailers, and others. Each man is assigned a symbol which he marks on the trees with a crayon or bark knife. Many property owners object to the use of the bark knife, especially on fruit, shade, and smooth-barked trees, and blue crayon has been used extensively in recent years. The blue crayon makes a visible mark which remains on the trees for long periods; so long that, under certain conditions, fresh marks cannot be readily distinguished from marks made several years ago. In order to determine whether any other color would prove satisfactory, selected crews in several sections where scouting work is done were furnished with red, green, white, and yellow crayons, and the field supervisors were instructed to report on the effectiveness of the marks under various conditions. Red and green crayon marks were not clearly visible, except on white and gray birches, and the white crayon did not have sufficient body for satisfactory work. The yellow crayon gave nearly as good results as the blue when used in woodlands, but certain characteristics render it unsuitable for use in open country, especially on fruit and street trees and on trees around residences. The marks left by the yellow crayon resemble those made by bark knives and would be as objectionable to the property owners. The yellow crayon is now being used in woodland scouting, especially in previously scouted areas where the old blue marks are still prominent. It is not yet known whether the yellow crayon will stand up reasonably well under adverse weather conditions, but if the marks remain legible for from 6 to 8 months this crayon should prove satisfactory in future woodland scouting work.

Spraying preparations in full swing.--Preparations for the beginning of the gypsy moth spraying season are in full swing in both the New England and Pennsylvania areas. Sprayers are receiving their final tune-up and other equipment is being tested. Large quantities of spray hose, suction hose, barbed wire, lead arsenate, fish oil, and other supplies are being moved daily from storage to central points in the field. Barbed-wire fences are being erected around the areas to be sprayed, and thinning work is being pushed at some locations that are to be sprayed and where thinning has not yet been completed. Actual spraying will be started as soon as the foliage has developed sufficiently to hold the poison.

Egg clusters found on dry leaves on the ground.--The crews assigned to duty in Russell, Hampden County, Mass., east of the barrier zone, are finding gypsy moth egg clusters on dry leaves on the ground. The area where these men are working is heavily infested and progress is slow.

World's Fair increases inspection and certification work.--Inspection and certification of nursery stock and other trees and shrubs originating in the area quarantined on account of the gypsy moth in Nassau County, Long Island, N. Y., increased considerably in April. Much of the nursery stock, and all of the large trees obtained from private estates, moved from this area are being used in landscaping the World's Fairgrounds near Flushing. This landscaping work, which is now more than 50 percent completed, will require at least 10,000 trees and shrubs.

Heavy infestation materially reduced by intensive treatment work.--Over 56,000 gypsy moth egg clusters were destroyed during the fiscal year 1937 at an infestation covering approximately 200 acres in Plains Township, Pa. Intensive treatment work, including spraying, was performed and only 944 egg clusters were found when the area was scouted this year.

Long fence erected in isolated infestation in pastured country.--A 4-strand barbed-wire fence approximately 10,000 feet long is being erected around the site of the isolated gypsy moth infestation in Damascus Township, in the eastern portion of Wayne County, Pa. This length of fence is necessary to insure the exclusion of animals from the section to be sprayed, as the colony is located in open country in a heavily pastured area.

Shipments of surface stone and forest products increase.--The opening of several new road projects resulted in a steady increase in the movement of surface stone from the quarantined area in Pennsylvania in April. More than 2,200 tons were inspected for the gypsy moth or moved under permit during the week ended April 9. Greater activity in the mines, caused by the seasonal reduction in the price of coal, has materially increased the shipments of mine props from the quarantined area. This increase will probably be of short duration, as the movement of mine timber definitely coincides with the amount of coal shipped, and only a limited amount of mine timber is sold when the mines are inactive. All surface stone and forest products moved from the quarantined area must be inspected or moved under permit.

Rhododendron and kalmia shipments temporarily discontinued.--Movement of rhododendron and kalmia plants from the Pocono Mountain region in Pennsylvania was temporarily suspended the first week in April. No plants could be dug because of the snow and cold temperatures and those already dug were so heavily coated with ice that they could not be safely moved or inspected. Operations were resumed the following week, after the snow and ice had melted, and large quantities of the shrubs were shipped out of the area quarantined on account of the gypsy moth.

Progress of C. C. C. gypsy moth work from camps in Vermont.--C. C. C. enrollees from the camp in Brunswick will soon complete work at a gypsy moth colony centered in growth along stone walls on a farm in Lancaster, N. H. Gypsy moth work from the camp in Waterbury is also nearly finished and the crew will soon be transferred to blister rust work. No new egg clusters were found in the territory covered by either of the crews. The crew from the Plymouth camp continues to find scattered gypsy moth infestations, mostly single-egg cluster, in several towns located east of the barrier zone in the south-central part of Vermont. Gypsy moth crews from the camp in Bellows Falls are working in heavily infested territory and have creosoted large numbers of egg clusters in several towns in the southeastern part of Vermont.

Change in C. C. C. enrollment methods.--In the future C. C. C. enrollments will be made each month instead of each quarter, so that camp quotas can be maintained at their maximum. The new arrangement will increase materially the man-days available for work throughout the year.

C. C. C. work concentrated in most heavily infested areas.--During the last few weeks C. C. C. men working in areas where there is a heavy gypsy moth infestation have been concentrated in the centers of population and have creosoted large numbers of egg clusters. They have destroyed more than 3,335,000 new egg clusters since July 1, 1937.

Celebration of the fifth anniversary of the C. C. C.--A meeting commemorating the founding of the C. C. C. was held at the Bellows Falls, Vt., camp during the week beginning April 4. As this camp is concerned mainly with gypsy moth work, considerable attention was given to this project at the indoor meeting. Later the visitors, which included the Governor of the State, were shown an excellent gypsy moth exhibit prepared by the superintendent and his gypsy moth foremen. Many of the visitors also attended the field section of the meeting, where actual field work such as scouting, creosoting, thinning, and climbing with ropes was demonstrated.

PLANT DISEASE CONTROL

Barberry eradication in Colorado active throughout the winter.--Since the first of January local laborers employed with emergency funds were used in the survey and eradication of native barberry in the agricultural areas of Montezuma, Archuleta, La Plata, and Costilla Counties. In these four counties 133 square miles were surveyed between January 1 and April 30. On 15 properties 309,640 barberry bushes and seedlings were found. Of this number, 302,790 were grubbed and burned; the remainder were found on more rocky ground and were treated with chemicals. Recent inspections of areas covered in the San Juan Basin during the early part of the emergency program show very little regrowth. In the areas that were grubbed the barberry population has been reduced by from 90 to 100 percent. Areas treated with atlacide at the rate of 6 pounds to 5 gallons of water, used as top spray and soil drench, have less than 2 percent of the former number of barberries. The rocky areas that were treated with dry salt or salt brine also show effective control. Resurveys of these areas are being made by trained chemical crews and a careful check is being made to treat all sprouts and missed bushes. The following table gives a summary of accomplishments by months since January 1.

Month	Counties	Area surveyed	Properties cleared	Bushes and seedlings destroyed	Man-days of labor	Relief labor
	Number	Square miles	Number	Number	Number	Percent
January----	2	9	4	99,140	910	96.3
February---	2	45	2	61,755	808	96.1
March------	2	40	3	66,370	783	96.2
April------	4	39	6	82,375	1,219	96.2
Total----	4	133	15	309,640	3,720	--
Average--	-	---	--	--	--	96.2

Large areas of Berberis fendleri still to be eradicated in Colorado.--During the early spring months, preëradication surveys were made in all grain-growing areas in Montezuma and Costilla Counties. Although only a small percentage of these counties was surveyed, 20 large areas of *B. fendleri* were found adjoining agricultural land. Examination of stubble and strawstacks indicates that stem rust was rather severe in these sections last season. The farmers and millers report frequent epidemics of stem rust and are very much interested in barberry eradication. When these preeradication surveys were made, farmers indicated a willingness to cooperate in the removal of bushes. A letter and a county map showing the location of properties on which barberries have been found and eradicated were recently sent to each county extension agent and to county pest inspectors in the State to inform them of the progress of the stem rust control in the various counties and to show the locations of barberry areas. The agent in Larimer County recently reported finding escaped bushes in the *B. vulgaris* area west of Loveland. Upon checking this location, five escaped barberries were found on two properties.

Spread of blister rust infection.--During April infected white pines were found in Ashland, Geauga, Lake, and Knox Counties, Ohio. A survey of the pine-infection center near Londonville, Ashland County, by E. E. Honey, of the Milwaukee regional office, and C. J. Dowd, State leader, showed that 1.6 percent of the 437 trees examined were infected on 1930-34 growth. Heaviest infection occurred on 1932 growth and 70 percent of the toal cankers were producing aecia. This area was first discovered in April 1938 by unskilled laborers. The initial eradication of wild Ribes (chiefly R. cynosbati), made late in August and in September 1934, has apparently prevented further infections on the native pine. One infected ornamental white pine tree was found on an estate near Chagrin Falls, Geauga County. It is believed that all infected trees on this estate have been removed by annual inspections made since 1934. Infected European black currants were found and destroyed on this estate in 1934. The first white pine infection to be reported in Lake County was found by Mr. Dowd near Willoughby. Infected European black currants were found and destroyed on this estate in 1934. Two juvenile cankers on 1933 growth and two on 1935 growth were found on four young native white pines in the northeast corner of Knox County by Messrs. Honey and Dowd on April 24. Infected R. cynosbati were found there in 1936 by the Ribes-eradication crews. European black currants were found approximately 1½ miles away in the spring of 1936 and destroyed. The known range of infection on white pine in Ohio has thus been extended during April to include three new counties. Blister rust on white pine was reported for the first time in Montmorency County, Mich., in April. Three cankers were noted on one tree--one of 1925 and two of 1930 origin. Infected white pine was found for the first time in Columbia County, Wis., on April 12 by E. R. A. skilled laborers. One infected tree was found approximately 1 mile southeast of Wisconsin Dells. The canker was on 1929 wood. The tree was so nearly dead that the canker produced no aecia. Two "fruiting" cankers were also reported on April 12 in Devils Lake State Park by T. F. Kouba. This park is located in Sauk County, where blister rust has been previously reported. Initial protection was afforded the the white pines in this park during the 1937 season. On April 12 L. W. Hodgkins and A. C. White, while making a survey of blister rust conditions in the northern part of Rhode Island, found blister rust in a plantation of white pines on the Pawtucket watershed. There are about 2 acres of trees approximately 10 years old in this area and the disease seems to be coming from wild Ribes in a swampy area on two sides of the plantation. The infection is scattered through the stand and ranges from 1932 to 1934 origin. There are some valuable white pine plantations on the watersheds in the State.

White pine planting.--In connection with the North Carolina reforestation program, a new forest seedling nursery is being laid out in Henderson County. Hundreds of thousands of white pines, as well as trees of other species, will be grown at this nursery. H. D. [illegible], in charge of blister rust control work in the State, writes that he has investigated the site of this nursery and finds no wild Ribes in the vicinity and no cultivated bushes within 1,500 feet. Control work in Indiana in the early part of April was devoted almost entirely to cooperative control work with the Soil Conservation Service. This Service has planted nearly 100,000 white pines on farms in the State in 1937 and 1938. The white pines are generally planted in a mixture with other conifers but they are taking a more and more prominent role in such plantings.

Phenological data.--Reporting for the Northeastern States, Roy R. Hirt, of New York, says: "During a trip to the Pack Forest at Warrensburg, N. Y., on April 15, I noted blister rust aecia beginning to break through the bark in some abundance. On April 30, aecia on white pine in plantations in the vicinity of Syracuse, N. Y. were fully mature and were disseminating aeciospores." In the North Central States aecial blisters were noted on April 24 on four infection study plots in central and northern Wisconsin, with aeciospores just beginning to be dispersed. The records show that aecial blisters on these same plots were well formed on May 15, 1937, and that perhaps 5 percent of the spores had been disseminated. It is apparent, therefore, that aecial development in this locality is about 3 weeks ahead of 1937. The first report of aecia in lower Michigan was on April 18, 1938, on the Anthony and tamarack pine infection plots in Newaygo County. On both areas fruiting practically ceased on April 23 and the Ribes leaves were slightly expanded. The season in this area seems advanced about 2 weeks over last year. In Montmorency County, Mich., the first appearance of aecia was on April 25. In the Southern Appalachian States this has been an exceptionally early spring. In Gilmer County, Ga., cultivated gooseberries were observed leafing out on February 9, whereas in Murray County foliage was noted on Ribes curvatum during the week ended January 29. In North Carolina Ribes in leaf were noted in Haywood County on March 23 at an elevation of about 3,000 feet. In Maryland foliage was observed on cultivated gooseberries in Carroll and Baltimore Counties on March 24 and on March 25 on wild gooseberries in the Catoctin Mountains. In Virginia leafing of R. cynosbati was reported on March 25.

Blister rust control in national parks in California and Oregon.--As a result of the advance of blister rust into northern California, the National Park Service is this year undertaking a program of Ribes eradication in Lassen Volcanic, Yosemite, and General Grant National Parks. Blister rust was found on Ribes just outside the southern boundary of Lassen Park in 1937. This park contains three species of white pine composing from 5 to 60 percent of the timber stand of nearly two-thirds of the park area. Sugar pine occurs at the lower elevations, western white pine at middle elevations, and white-bark pine at timber line. At present only the white pines on an area of 11,660 acres are considered of sufficient value to warrant their protection against destruction by blister rust. The National Park Service is assigning about 175 C. C. C. enrollees to perform the initial Ribes-eradication work on the area selected for protection. The personnel of the Bureau's regional office at Oakland will give advisory and technical supervision to the work on all the parks where control work will be carried out. In Yosemite Park, which is farther removed from known infections of rust but which supports far more extensive and valuable stands of white pine, a larger program is planned. Two complete C. C. C. camps and part of a third, totaling about 375 men, will eradicate Ribes in sugar pine type, which comprises 123,000 acres. An extensive reconnaissance of large areas of western white and white-bark pine in the high back country will be made by a three-man party. In addition, plans are being laid for 3 E. R. A. camps of 100 men each, which will also operate in sugar pine types if E. R. A. funds are allotted to the Park Service for this purpose. General Grant Park is a small park of 2,560 acres that was set aside to preserve a fine stand of "big trees" (Sequoia gigantea), which are associated with an equally fine stand of sugar pine. A sufficient number of C. C. C. enrollees will be assigned to control work to complete the initial Ribes eradication in this park. Sequoia National Park, situated near the extreme southern end of the Sierra Nevada, has in parts a good growth of sugar pine associated with its magnificent sequoias, but has more notably one of the few areas where the extremely rare foxtail pine (Pinus balfouriana) grows. This unusual 5-needled pine is found only in California and there grows only in comparatively small stands at two or three widely separated places. Sequoia Park also has western white pine and a small amount of limber pine (P. flexilis). In 1938 a rough preliminary survey of these generally inaccessible areas will be made by Bureau blister rust men, cooperating with the Park Service, to obtain some idea of the control problems involved. In Crater Lake National Park, in Oregon, 50 C. C. C. enrollees will complete Ribes eradication on a 1,145-acre control unit established last year.

COTTON INSECT INVESTIGATIONS

A new foreign parasite of the pink bollworm.--A shipment of Microbracon nigrorufum Cush., a parasite of the pink bollworm, was received by L. W. Noble, of the Presidio, Tex., laboratory, on May 2. The material was collected and shipped from Japan by the representatives of the Division of Foreign Parasite Introduction, was received at the Moorestown, N. J., laboratory, and was reshipped by T. R. Gardner. The original shipment, containing 7,000 cocoons and 832 adults, was shipped from Yokohama on April 14 and arrived at Moorestown on April 30. The mortality of the adults from Japan to Moorestown was only 11.5 percent. The cocoons were placed in cool storage at Moorestown and the adults were fed, watered, and repacked for shipment by air express to El Paso. The parasites were in good condition upon arrival at Presidio on May 2, with 731 adults alive. The females will oviposit on Ephestia larvae but it is not known whether the parasites will successfully develop on this host.

Cotton leaf worm in Puerto Rico.--L. C. Fife, Mayaguez, P. R., reports that the cotton leaf worm was found continuously in Puerto Rico from August 1935 to January 1938, which shows that this pest may overwinter in this area. Since the island has two cotton sections with seasons at opposite periods of the year, the leaf worm is able to find suitable food at any time. Even under these apparently favorable conditions, its population density per unit area varies greatly at different periods of the year and at any given time in closely adjacent areas. Most farmers do not purchase insecticides to protect their crop. An abundance of caterpillars on the young growing plants may cause a severe loss, especially in areas of light rainfall. If favorable rains do not follow the incursion of the caterpillars, the plants have no reserves for sending out new leaves and, as a result, they either die or develop only a few fruiting forms. Whether or not favorable rains are encountered, the main crop is still delayed 2 or 3 weeks by the damage, thereby subjecting it to a heavier infestation by other insect pests.

Effect of planting date on cotton production and boll weevil damage to bolls.--Observations were made by E. W. Dunnam and J. C. Clark at Stoneville, Miss., on the boll production and mature bolls containing boll weevil cells on cotton planted on the 1st and 15th of each month from April 1 to July 15. This work showed that the 340-foot rows, planted on April 1, produced a total of 3,671 bolls. But as the season advanced the numbers decreased to 256 bolls on rows of equal length seeded on June 15. The July 1 and July 15 plantings did not yield a single boll. The number of open bolls required to make a pound of seed cotton for the April 1 planting was 87.4, but for the April 15 planting only 77.2 bolls were required. From this date as the season advanced this number increased to 116.4 for the June 15 planting. For the first planting there were 524.4 perfect bolls for each boll containing a weevil cell. For the subsequent plantings this number dropped to 172.7, 65.1, 16.1, 5.4, and 2.2. The total production of seed cotton per acre for the April 1 planting was 1,614 pounds. As suggested by the boll size, even though the number was slightly less, the production for the April 15 planting increased to 1,807 pounds. The weights for the other plantings decreased to 1,459, 1,459, 1,220, and 83 pounds per acre. The April 15 planting produced more seed cotton per acre than any other planting and the number of weevil cells in the bolls was not great enough to affect the commercial grade. Boll weevils did not infest this cotton until migration took place between July 28 and August 6. No attempt was made to poison the boll weevil and the cotton was never infested by the leaf worm.

Tests against cotton root aphids.--Tests conducted against the root aphids *Trifidaphis phaseoli* (Pass.), *Rhopalosiphum subterraneum* Mason, and *Anuraphis maidi-radicis* Forbes on cotton were reported by C. F. Rainwater, of Florence, S. C. In the first series of experiments the materials were mixed in the soil of the seedbed from 2 to 3 weeks before planting at the following rates per acre: Oil of tansy, 5 gallons, and 400 pounds of lime; 600 pounds of flake naphthalene; 400 pounds of paradichlorobenzine; 100 pounds of derris; 200 pounds of sulphur; and 600 pounds of tobacco dust. The seed in all of the plots, with the exception of the paradichlorobenzine treatment, came up to a good stand. On the plots treated with paradichlorobenzine the germination was very poor, the plants were stunted, and most of them died. Practically all of the aphids were also killed by this treatment, an average of only one colony per 100 feet of row being found. On the derris-treated plots 2.5 colonies and on the tobacco-dust plots 3.5 colonies per 100 row feet were present in comparison with 7.5 and 10.5 colonies in the checks. The other treatments did not reduce the number of aphid colonies. In another series of tests conducted in a field where the cotton had been killed by the aphids and it was necessary to replant, the materials were lightly mixed with the soil and the seed was immediately planted. Two hundred pounds of tobacco dust, to which 0.25 percent rotenone from derris powder had been added, 272 pounds of sulphur and 255 pounds of flake naphthalene per acre were used in the respective plots. The tobacco-derris and sulphur-treated plots came up to a good stand, whereas in the naphthalene plots the seed germinated but the plants were killed before they came through the ground. In the third series of tests the materials were mixed with the cotton seed just before planting, at the following rates per 100 pounds of seed: 1 pint of oil of tansy and 5 pounds of lime; derris, 1.6 pounds; sulphur, 3.2 pounds. All of the seed came up to a good stand but the seed treated with oil of tansy was delayed 24 hours in coming up, whereas the seed treated with derris germinated quicker and were up 24 hours earlier than the checks. No difference in germination was noted between the seed treated with sulphur and the checks, and in a few days no differences were noted in the growth of any of the treatments. There was very little reduction in the number of aphid colonies.

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PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

The 1938 crop.--The planting of the 1938 cotton crop is nearing completion in all districts except the Texas Panhandle. In that area planting is always later and is largely dependent on moisture conditions. The earliest plantings are made in the lower Rio Grande Valley of Texas, and the crop in that section is making excellent progress. Indications are that the first bale will be ginned by the middle of June or earlier, and ginning will be in full swing by the first of July.

Stub cotton.--In Arizona it is customary to grow cotton from stubs for several years at a time, as this method is more economical. This season plans had been made to grow several thousand acres of stub cotton in the regulated area, but cold weather killed a considerable amount of the cotton and reduced the stand to such an extent that in most cases farmers decided to plow up the stub cotton and plant in the regular way. In the Big Bend area of Texas more stub cotton came out this year than ever before. Much of this was destroyed as land was prepared for the new crop but there is still a good deal left on acreage lying idle. Toward the close of the month some of the stub cotton was beginning to fruit, and a considerable number of squares were inspected without finding any infestation. Additional inspections will be made during the coming month. Some of the farmers have stated that they will destroy the stub cotton if much of an infestation develops on it.

Inspection.--Laboratory inspection of green-boll samples has been continued at San Antonio with negative results. Included in the inspections were 151 samples of 100 bolls each from the area in northern Florida which was under regulation several years ago, and 35 samples from counties in southern Georgia near a previously regulated area. In samples inspected at field stations, 114 specimens of the pink bollworm were found, all of which came from counties within the regulated area and where infestation had already been established last fall by gin-trash inspection. In addition to the above, a considerable quantity of Thurberia bolls, collected in various mountain ranges of southern Arizona, were inspected. A total of 35,471 Thurberia bolls were inspected and 9,492 specimens of the Thurberia weevil found, but no indications of the pink bollworm were seen.

Thurberia-plant eradication.--During the month of April 7,490 acres was worked in the Santa Catalina Mountains of southern Arizona and 8,162 Thurberia plants were destroyed. Most of these plants were infested with the Thurberia weevil. Little time was lost from work on the cotton line by unfavorable weather, but high winds were experienced at the camp site and tents were continually being blown down. Nevertheless, activities went forward satisfactorily and it is estimated that work can be carried on from the present camp location until the end of June.

Wild-cotton eradication.--Conditions continued to be quite favorable for wild-cotton work in southern Florida and excellent progress was made in all areas. Work was completed at Cape Sable on April 30 and all of the equipment has been dismantled and placed in storage in Miami. During the season the entire Cape Sable area was cleaned twice, and some 300 acres east of camp were cleaned three times. In addition, about 102 acres were cleaned for the first time and a number of seedlings destroyed. In ordinary years this area would be very difficult to reach but the men were able to enter without much difficulty this year, as it has been especially dry. Along the upper west coast a third recleaning for the season is now under way. At a number of locations where cotton previously existed none is being found at this time, and when plants were found the number did not usually exceed 10 or 12. This section seems to be in excellent condition. In the Everglades section of Collier County and the Florida Bay section of Monroe County, several small colonies of virgin cotton have been located and cleaned. While the plants were being destroyed a few bolls were inspected and three specimens of the pink bollworm were found. Work on the mainland keys has gone forward, with most of the area having been cleaned twice this season. During the month 10½ acres were cleaned for the first time, from which 441 mature and 405 seedling plants were removed. The recleaning covered 7,791 acres, on which 89,472 seedling and 212 sprout plants were removed. While the second and third recleanings are being made the crews are devoting some time to a thorough scouting of areas near wild-cotton locations and other sections where it might occur. During the month over 3,000 acres were covered without finding any plants.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Adding oil emulsion to derris sprays or dusts increases toxicity to plant bugs.--Laboratory tests were performed during the last 10 months at the Columbus, Ohio, laboratory by R. A. Fulton and N. F. Howard in an effort to determine whether the toxicity of derris root powder in water to plant bugs could be increased by the use of oil emulsions. They showed that the toxicity of derris, nicotine, nicotine sulphate, and anabasine sulphate to the squash bug (Anasa tristis Deg.) was markedly increased by the use of certain oils, especially peanut oil. The toxicity of derris was greatly increased when acetone was added to the powder 24 hours before use and was still further increased when peanut oil was used. Peanut oil appeared to be the most effective of the oils tested, which, in addition to the latter, included tung oil, teaseed oil, corn oil, olive oil, and petrolatum. More recently peanut oil mixtures and pine oil mixtures have been tested against the harlequin bug (Murgantia histrionica (Hahn) with similar results. Derris-talc dust mixtures in which peanut oil has been impregnated have also been experimented with in the laboratory and it appears that the addition of peanut oil or pine oil to a derris-talc dust mixture greatly increases its toxicity. In fact, a derris-talc dust mixture without an oil and containing 0.5 percent of rotenone is very nearly innocuous against the harlequin bug. The status of a wetting agent in the derris-talc-oil dust mixture has not been determined definitely, but it is believed, on the basis of results obtained in preliminary experiments, that a wetting agent is unnecessary in this mixture and may be detrimental.

Sweetpotato weevil adults live for long periods without food.--In a series of experiments in field cages simulating natural conditions at Sunset and Houma, La., during the winter of 1937-38, K. L. Cockerham, of the Sunset, La., laboratory, found that of adults of Cylas formicarius (F.) one individual lived 118 days without food during the period extending from November 23, 1937 to March 21, 1938, whereas other individuals lived 86 days. In cages placed over green sweetpotato vines certain of the C. formicarius adults lived 92 days. These cages were placed in position in the autumn of

1937 in the latter part of the sweetpotato harvest season and before the fields were cleaned. In general, it was found that access to food prolonged the life of adults in the field. There was no significant difference between the longevity of sweetpotato weevil adults held in cages at Sunset, La., and at Houma, La., nor was there any appreciable difference in adult survival between the cages protected from direct precipitation and those exposed to precipitation. The results obtained from the cages indicated also that newly emerged adults that had not fed at all, or had fed very little before being placed in the cages, did not live as long as adults that had fed for several days. It was indicated that, both with and without food, the females apparently lived longer than males. While only a small percentage of the total adults used in these tests lived throughout the winter period without food, it appears that this phenomenon may occur in any season when conditions are favorable, thereby affecting adversely the clean-up or eradication of farms infested with the sweetpotato weevil.

Fumigation with methyl bromide seriously injures narcissus bulbs.--F. S. Blanton, of the Babylon, N. Y., laboratory, reports that fumigation with methyl bromide as applied in the attempted control of the bulb nematode (Ditylenchus dipsaci (Kuhn) Filipjev) caused severe injury to the treated bulbs. Observations on the flowering of such bulbs that did not deteriorate completely before planting time demonstrated that the flowers produced by such bulbs were smaller than those produced by untreated bulbs and that, in most instances, the flowers were bleached in color and the foliage was stunted.

New facts on hibernation of tobacco flea beetle.--As a result of quantitative sampling of hibernation media for overwintering adults of Epitrix parvula (F.) in several environments in the Oxford, N. C., locality, W. A. Shands and his associates found that far greater numbers of the E. parvula adults, per unit of area, were present in old, undisturbed tobacco fields than in fields of grassland or on the edge of woods. Within the tobacco fields the greatest numbers of flea beetles were found in the immediate vicinity of the old stalks, and fairly large numbers were found in the dead suckers still attached to such stalks. Formerly it had been believed that the majority of E. parvula adults overwintered along the edges of woodlands.

Sweetpotatoes left on soil surface prove source of weevil reinfestation.--Mr. Cockerham, Sunset, La., reports that the adults of the sweetpotato weevil emerged on March 10 and 24 from rotten sweetpotatoes that had been exposed on the soil surface of infested fields from the time of harvest during the autumn of 1937 to February 24, 1938, when they were collected for adult emergence observations.

Lead arsenate effective against vegetable weevil larvae in tobacco plant beds.--F. S. Chamberlin, of the Quincy, Fla., laboratory, reports that lead arsenate applied either in the dust form or in a liquid spray gave a satisfactory control of the larvae of Listroderes obliquus Klug. infesting tobacco plant beds in the Quincy district. Lead arsenate added to the recommended spray for blue mold apparently formed a compatible mixture and caused no detectable burning of the foliage. On the other hand, cube root powder applied either as a dust or in a spray gave little control of the vegetable weevil larvae in tobacco plant beds. Before the application of lead arsenate sprays or dusts considerable damage was caused by vegetable weevil larvae in feeding on the tobacco in the plant beds and some of these larvae were carried on the plants to tobacco fields, during the process of transplanting, where they continued to feed until controlled.

Lima bean pod borer causes marked injury to lima bean crop in southern California.--Rodney Cecil, of the Ventura, Calif., laboratory, reports that a survey of the 1937 crop of lima beans produced in Ventura, Orange, and San Diego Counties of southern California, disclosed that the average loss to the growers from beans damaged by Etiella zinckinella (Treit.) and the cost of removing such damaged beans during the cleaning process, averaged approximately 28 cents per sack for the 1,087,190 100-pound sacks of beans involved in this survey. The total estimated loss from the sources mentioned amounted to approximately $300,000.

INSECTS AFFECTING MAN AND ANIMALS

Toxicity of phenothiazine to poultry lice.--Preliminary tests made by H. E. Parish, of the Menard, Tex., laboratory, show that most of the body lice of chickens are killed in 24 hours and are completely destroyed in 4 days by dusting the birds with phenothiazine.

Cashew nutshell oil toxic to mosquito larvae.--H. H. Stage, Portland, Oreg., reports that a high degree of toxicity was exhibited by cashew nutshell oil in several laboratory experiments on species of flood-water mosquito larvae.

Pine oil activators increase toxicity of pyrethrum extract to mosquito larvae.--Preliminary tests made by W. V. King, Orlando, Fla., with pine oil activators, in combination with pyrethrum extract and a base oil, gave the following results against the larvae of the southern house mosquito (Culex quinquefasciatus Say):

Mixture	Pyrethrum per gallon	Quantity per acre	Mortality in-- 1 hr.	6 hrs.	24 hrs.
	Pounds	Gallons	Percent	Percent	Percent
Plus base oil and 10-percent activator	0.1	6.6	89	94	96
Plus base oil only	.1	6.6	7	14	34
Base oil and 10-percent activator	.0	6.6	0	7	19

Experiments on natural food of primary screwworm fly.--Cage tests at the Valdosta, Ga., laboratory on the effect of natural food materials on the longevity of Cochliomyia americana Cushing and Patton have shown that adults were able to survive for periods longer than 23 days and to produce fertile eggs when fed only a diet of oranges, grapefruit, or tomatoes;

whereas, when supplied with only animal feces or liquid secretions from wounds, they died in from 3 to 8 days, or as quickly as with no food at all.

FOREIGN PLANT QUARANTINES

Sealed tins found to contain fresh fruits and vegetables at port of New York.--On the S. S. Borinquen, on March 28, a passenger from Puerto Rico came ashore with four tin cans sealed with solder and declared them to contain preserves and dulce (Spanish for sweets). The passenger's actions and the weight of the cans caused the inspector to suspect something irregular. Opening the sealed cans revealed no preserves. Instead the cans contained restricted and prohibited fruits and vegetables consisting of: 15 pounds of bananas, 8 pounds ginger roots, 2 pounds chayotes, 15 pounds sweetpotatoes, 4 pounds malangas, 2 pounds plantain leaves, and 4 pounds fresh sugarcane. Approximately 20 percent of the sweetpotatoes were infected with Ceratostomella fimbriata and five of them were found infested with Cylas formicarius larvae. The next day on another ship, the S. S. San Juan, the same inspector found another sealed can under similar circumstances and it contained preserves as declared but, upon probing the preserves, four fresh jobos were uncovered. These fruits were evidently dropped into the cold preserves and the can sealed just before the passenger sailed from Puerto Rico. It was obvious that these passengers believed the sealed cans would not be opened by the inspectors where opening would mean a total loss of the preserves to the passenger.

Merodon in gladiolus corm.--On March 2, 1938, a shipment of gladiolus corms from Italy arrived at the Inspection House, Washington, D. C. Upon inspection, one of the corms was found to be infested with a larva which was identified as Merodon sp. This is our first interception of the greater bulb fly attacking gladiolus corms.

Fruitflies found in a suitcase.--On September 23, 1937, one living larva and three living pupae of the Mediterranean fruitfly (Ceratitis capitata Wied.) were intercepted at New York on decayed peaches in an old suitcase in baggage from Italy. The suitcase in which these insects were found was abandoned by the passenger and destroyed by the Customs, after every other article which it contained had been carefully inspected.

Entomological interceptions of interest.--Six living larvae of the dark fruitfly (Anastrepha serpentina Wied.) were intercepted at El Paso, Tex., on January 11 in a tangerine fruit in passenger's baggage from Mexico. Three larvae and one pupa, all living, of the fruitfly Anastrepha suspensa Loew. were intercepted at New York on January 10 in two guava fruits in baggage from Puerto Rico. One living and four dead adults of the weevil Apion pomonae F. were taken at Portland, Oreg., on March 11 in vetch seed contaminating packing material for cargo from Belgium. The scale insect Morganella longispina (Morg.) was found at Seattle, Wash., on December 29, 1937, on the rind of pomelo in baggage from China. A living adult of the chrysomelid Coenocalis quinquelineata Latr. was taken at Laredo, Tex., on February 2 on a banana in cargo from Mexico. A living specimen of the mirid Jornandes intermedius Dist. arrived at the airport at Brownsville, Tex., on December 24, 1937, on a gardenia in cargo from Mexico. Living specimens of the coccid Odonaspis saccharicaulis (Zehnt.) were found at Washington, D. C., on December 7, 1937, on Saccharum sp., in the mail from New Guinea. The identification was made by H. Morrison from description only. A living specimen of the lygaeid Gastrodes japonicus (Stal) was intercepted at Honolulu, Hawaii, on July 23, 1937, on a pine cone in baggage from Japan. Twenty-three living larvae of the turnip gall weevil (Ceutorhynchus pleurostigma Marsh.) were taken at Port Arthur, Tex., on January 2 in a single turnip in ship's stores from France. A living larva of the Asiatic rice borer (Chilo simplex Butler) was intercepted at San Francisco on April 1 in a wisteria plant in cargo from Japan. It was found in the gallery of a coleopterous larva.

Pathological interceptions of interest.--Botrytis allii Munn was intercepted from Greece for the first time on January 26, 1937, in an onion bulb in cargo at New York. B. squamosa Walker was intercepted for the first time at New York on February 25, 1937, in a cargo shipment of garlic from Chile. Cercospora musae Zimm. was intercepted on banana leaf fragments from Guatemala at Boston on May 2 and from Java at Philadelphia on May 3. Colletotrichum sp. (no species reported on host) was found on Stapelia from Uganda, Africa, on December 21, 1937, and another species on Stapelia from Aden, Arabia, on December 30, 1937, both at San Francisco. Leptosphaeria rusci (Wallr.) Sacc. was intercepted at Philadelphia on leaves of Ruscus in wreaths in cargo from Italy on April 5. Monochaetia compta All. var. ramulicola Berl. & Bres. was intercepted for the first time on January 24, on manetti rose stocks from Holland. Phoma hypoglossi (Mont.) Sacc., first interception, was found at New York on Ruscus leaves from Italy, on December 18, 1937. Phomopsis juglandina (Fckl.) Trav. and Verticilliodochium tubercularioides (Speg.) Bub., first interceptions, were found at New York on walnut scions in a shipment from Poland, January 23, 1937. Phomopsis seposita (Sacc.) Trav., first interception, was found at San Francisco on Wistaria venusta alba in mail from Japan on January 7. An immature ascomycete, probably Diaporthe seposita Sacc., was associated with P. seposita. Puccinia cannae (Wint.) P. Henn. was intercepted from Mexico for the first time on April 28 at Brownsville on canna leaves on two plants in baggage. Rhabdospora sp. (no species reported on Paeonia) was found at San Francisco on Paeonia moutan plants in two shipments from Japan on December 23, 1937, and March 11, 1938.

DOMESTIC PLANT QUARANTINES

White-fringed beetles emerging.--The first adult beetles to be found this season were discovered on May 5 in the known infested area at New Orleans, in soil that had been stirred. Emergence in that locality was well under way by May 10.

White-fringed beetles found in more localities.--Larval inspection has recently brought to light an infestation of Naupactus leucoloma Boh. at Taylorsville, Smith County, Miss., bringing the number of infested counties in that State to four. A more widespread infestation was found at Gulfport, Miss., than was known to exist and the State has quarantined 280 square miles in this area. At New Orleans larval inspection has shown that the infestation formerly known to exist on 60 acres extends over 20,000 acres, and Louisiana has quarantined the parishes of Orleans and St. Bernard and part of Jefferson Parish. Systematic inspection for adult beetles will be carried on cooperatively, it is anticipated, in every county in Louisiana, Mississippi, Alabama, Florida, Georgia, and in parts of Texas, Arkansas, Tennessee, and South Carolina.

White-fringed beetle control activities.--Trap crops are being planted in areas where there are no preferred native host plants. Results of experiments as to the most effective and economical method of clearing woodland areas indicate that a steel wagon mounted with a 5-fire jet flame thrower recently constructed in the Florala, Ala., shop will work out satisfactorily. Experiments in clearing woodland by labor, conducted jointly with the State of Florida, show a cost of from 90 cents to $11.20 per acre, depending on the nature of the ground cover. In the Florala area 1,100 acres of land have been disced, 164 fence lines cleared, 27 miles of right-of-way surveyed, and 24 cleared, and 12 linear miles of new terraces built for protection against erosion. Another shipload of animal bones from Uruguay was inspected with negative results. Quarantine enforcement on a 24-hour basis has been necessitated by increased movement of garden truck, bedding plants, farm implements, cottonseed, and other articles. Merchants, filling-station operators, and the public are cooperating. Freight waybills are checked and nurserymen have provided us with lists of shipments from their premises for the last 3 years.

Educational work on white-fringed beetle.--To carry on the search for the beetle during the next few weeks, an all-inclusive educational program has been set up through various channels through which it is hoped to enlist the help of a wide range of organizations and individuals throughout the four infested States in collecting and sending in suspicious-looking specimens. A taxonomic unit is being established at Gulfport, Miss., in cooperation with the Division of Insect Identification. Posters describing the insect and a four-page illustrated circular will be distributed. Eighteen hundred exhibits of crops showing larval damage have been prepared. Motion and still pictures of larval feeding signs have been added to the material. Meetings with 4-H Club members, students, and others are well attended.

Mormon cricket hatch.--Cold and rainy weather throughout the infested States has retarded hatching and development of the crickets. Certain areas in Utah, Idaho, Oregon, and Washington showed a 100-percent hatch the middle of April and dusting operations were begun in five counties of these States. The following week the crickets had developed to the second, third, and fourth instars in the above States. In Washington they were migrating into the arid trenches which had been constructed in Franklin County to protect adjoining wheatfields. The few which were able to cross the barrier were poisoned with dust. A 95-percent hatch was reported in Nevada the third week in April and dusting was begun the following week. Crickets in that State showed a tendency to migrate in earlier instars than in former years. In Wyoming the hatch ranged from 10 to 60 percent the middle of April and slightly lower in Montana. By the last of the month they were migrating in many spots in these two States, necessitating the cleaning of ditches and making ready for oiling and burning. The Colorado hatch began the last week of April. Egg fertility in the various regions ranged from 50 to 90 percent and as low as 10 percent in one area in Wyoming.

Mormon cricket control operations.--Working plans are completed for cooperative Federal-State dusting operations in Utah, Colorado, Wyoming, Montana, Nevada, Washington, Oregon, and Idaho. Counties and communities are contributing to the campaign and farmers are responding favorably to prompt delivery of materials. The present field force consists of 34 appointed employees, 11 under letters of authorization, and 167 laborers. Dusting operations in Utah are showing kills of from 90 to nearly 100 percent; in one Idaho locality, 99 percent; in Nevada, from 75 to 95 percent on the 287 acres worked to date, hand dusting effecting a 90-percent kill. In Oregon crickets began to die in from 6 to 8 hours after the dust was applied. Rains in one Idaho area were believed to have caused 30-percent mortality to hatching crickets. Field leaders in that State report that a species of scarabaeid beetle and also the black widow spider have been observed eating small crickets. The presence of predaceous wasps was also noted. Purchases had been made up to April 15 as follows: 61 tons of sodium arsenite; 45 miles of metal barrier; 80 hand dust-guns; 157 tons of diatomaceous earth; 12 power dusters; and 900 barrels oil. Motion pictures of the crickets and of the control operations were recently taken in a Utah area.

Grasshopper control activities.--The organization of grasshopper control work has been effected with a force of 15 workers at the field headquarters office at Minneapolis and 81 field supervisors in the 24 States in which the work is conducted. Participating counties applying for Federal aid to fight grasshoppers are organized on both a county and a township basis. Old mixing stations have been conditioned and new ones constructed. Mechanical bait spreaders are being constructed to supplement the 5,000 on hand. Hatching began the latter part of March in the southernmost States of the area, and by the first week in May the hatching had reached 100 percent in some spots, was general in Kansas and Colorado, and was beginning in the Northern States.

Grasshopper poisoning begun.--The application of poison bait to areas infested with hoppers, which has been limited thus far this season to a few spots in Arizona, California, Oklahoma, and Texas, was being extended generally the first of May and will progress northward as the hatching increases. It is estimated that 178,000 tons of bait will be needed in the 24 States. Over 39,000 tons were left on hand in these States from previous years, over 20,000 tons have been shipped to the various regions, makking available for immediate use 41,000 tons in the Great Plains, 17,000 in the Mississippi Valley, and 1,400 on the Pacific Slope, or approximately 33 percent of the estimated needs. Additional purchases are being made and will continue to go forward in such amounts that there will be no shortage of materials when needed. Field supervisors are holding demonstrations and timing the work in the hope of poisoning young hoppers concentrated on the hatching grounds. Farmers and sheep herders are supplying information as to infested localities. Four high schools in Wyoming are building mechanical spreaders. An organization in New Mexico gave dances, called "grasshopper hops," to raise funds for this purpose and also auctioned pies at $5 to $15 each.

Armyworm infestations.--To control severe outbreaks of armyworms, which have appeared in Arkansas and Mississippi, funds have been made available from the grasshopper control project, and grasshopper bait is being utilized. The infestations are localized and the later reports from the field indicate that the attack on economic crops is gradually abating. The Mississippi infestations are principally on oatfields.

Peach mosaic inspection and eradication under way.--Peach mosaic inspection was started in California in March and in Texas, New Mexico, Utah, and Colorado in April. The affected States have assigned an increased number of inspectors to the project. There are 55 Federal and 32 State inspectors at work, in addition to 4 from the Experiment Stations and Extension Service, 35 relief men, and 6 California county inspectors. The States of Tennessee, North Carolina, and South Carolina are each assigning an inspector in New Mexico for training in mosaic inspection. The April work covered 269,000 trees on over 3,000 properties. The environs of 42 nurseries and budwood sites in eastern Texas were inspected, and 3 were found exposed to the disease. A few spots of peach mosaic infections are being found in parts of the Palisade area of Colorado after partial inspection. Experiments are being conducted in this area jointly by the Department, the State, and the Experiment Station, in placing healthy peach grafts in plums as a method of inspection to determine whether the plums so grafted are symptomless carriers of the disease. The educational work in New Mexico has been strengthened by a news letter on peach mosaic published in Spanish by the State leader, R. F. Crawford. County agents in infected counties, agricultural high-school classes, civic organizations, and others are also cooperating.

Tree removal work under peach disease projects.--Relief labor has been increased in Colorado, New Mexico, and Utah and eradication of diseased, abandoned, and escaped peach trees for control of the phony peach and peach mosaic diseases is continued in Alabama, Arkansas, California, Georgia, Tennessee, and Texas, with a force of 318 relief employees. A greater part of the removal work has been centered around nurseries growing peach stock and in removing abandoned orchards.

Sweetpotato weevil activities.--Sweetpotato fields as a whole are reported in good condition. The inspection which has been carried on jointly with the State on all properties found infested last season is being extended to all adjacent properties to check the growth of any volunteer host plants. Weevils were recently found in Angelina County, Tex. A preliminary cooperative survey in two coastal counties in South Carolina shows that inspection is needed in those counties in which suitable morning-glories were found. Thomas County, Ga., owing to its high rank in sweetpotato production in the South, is being thoroughly inspected. Fifteen laborers are cleaning the fields and two State inspectors will continue in this county, it is expected, throughout the season. Trapping in Alabama shows that the adult weevil population is on the decline. The standardized quarantine adopted by Georgia is being adequately enforced. As new properties are found infested, seedbeds within a half-mile radius of infestations are being removed, in some instances necessitating the destruction of seedbeds planted prior to the adoption of the quarantine. No opposition has been encountered in this work.

Citrus canker eradication.--Reinspection in March of all properties in two Texas counties found to be infested since 1935 brought to light canker on 1 small seedling in Harris County and on 16 seedlings on 2 properties in Jefferson County. All grass, weeds, and briars were thereupon burned with a pear burner, not only on the spots where the canker was found but on all 18 properties formerly found to be infected, and this process will be repeated every 2 or 3 months, Mr. Heard states, in the hope of preventing the recurrence of canker. In the present calendar year thus far inspection has been made of over half a million trees on 654 properties in 4 Texas counties. About two-thirds of the trees have been destroyed. The present force of 4 Federal, 4 State, and 2 experienced relief inspectors are working Texas. The relief labor force has been increased from 20 to 39.

Dogwood air shipment inspected.--Through a St. Louis newspaper item, a transit inspector learned that a dogwood tree was being shipped by airplane to that city from the World's Fair headquarters near New York City. Examination at destination indicated that the tree had not been inspected, and the tree and soil were accordingly treated before release and the incident was reported to the Japanese beetle project leader so that any further shipments might be inspected at origin.

Transit-inspection activities.--The inspection forces have been increased for the spring nursery-stock shipping season at Pittsburgh and New York, and an inspector has been assigned at Buffalo for the remainder of the season. M. E. Connolly, transit inspector at St. Louis, is cooperating with the Division of Foreign Plant Quarantines in the enforcement of quarantines at that point.

Revisions of quarantine regulations.--The regulations of Quarantine 48 were revised, effective April 11, to extend the regulated areas in six States. The regulations of the District of Columbia were simplified and redrafted, effective April 30. Circular B.E.P.Q. 472, relating to sterilization of fruit for the Mexican fruitfly, was revised on April 8 to reduce the holding period from 8 to 6 hours in fumigation. Circular B.E.P.Q. 395 was revised on March 18 to exempt from Japanese beetle certification peat when treated with crude petroleum or other insecticide.

CONTROL INVESTIGATIONS

Colorado potato beetle in spring dormancy.--A stock of Colorado potato beetles was collected in April by M. C. Swingle and A. M. Phillips, of the Sanford, Fla., laboratory, for use in insecticide-testing work. The species was found feeding on eggplant in Seminole County, Fla. Over half the adults collected and those reared from larvae which were field-collected soon entered the soil for a period of dormancy. On the basis of a single generation reared in the laboratory with daytime temperatures of 85°-90° F., the length of the egg stage was found to be about 4 days, the larval stage 16 days, the pupal stage 10 days, and the adult over 6 weeks. After emerging from the pupal stage, the adults feed for about 2 weeks before laying eggs, which would make a complete generation every 6 weeks. Although temperature may be a partial cause of dormancy of the species in this locality, it appears possible that the physiological condition of the insect may be just as important in bringing on the period of estivation.

Absorption of glucose by southern armyworm.--In studies on metabolism in *Prodenia eridania* Cram., being carried on in the Beltsville, Md., laboratory, the variation in reducing sugar content of the blood (hemolymph) of the insect following glucose ingestion has been studied by F. H. Babers. Sandwiches made from turnip leaves, with a filling of glucose-cornstarch paste, were fed to sixth-instar larvae and the blood sugars were determined quantitatively at varying time intervals. The normal reducing value of the blood of the southern armyworm has previously been found to be 75 mg per 100 ml of blood. Fifteen minutes after feeding on a glucose sandwich began, this value rose to 165 mg per 100 ml and continued to rise steadily to a maximum of 581 mg per 100 ml in 1½ hours. The reducing sugar value then fell off sharply and was normal again 6 hours later. The utilization of this glucose by the insect is now being studied.

INSECTICIDE INVESTIGATIONS

Synthetic insecticide patented.--It has been known for some time that 4, 6-dinitro-o-cresol has high insecticidal value; however, it is injurious to growing plants and for that reason its use is limited to dormant sprays. L. E. Smith has found that, if an ether of this phenol is prepared, the resulting compound is effective in killing many species of insects; also, it can be sprayed or dusted on delicate foliage without injuring it. Suitable ethers are the methyl, ethyl, and phenyl ethers. On mosquito larvae in aqueous solutions 4,6-dinitro-o-tolyl methyl ether was very toxic. In laboratory tests on codling moth larvae 4,6-dinitro-o-tolyl ether in water suspension at a concentration of 2 pounds to 50 gallons of water gave 73.2 percent of clean fruit. Under the same conditions lead arsenate gave only 53.5 percent of clean fruit. Public service patent 2,115,046 was granted to Mr. Smith on April 26, 1938, covering this development.

A new duster patented.--L. D. Goodhue, of this Division, has been granted U. S. Patent 2,114,092 for a continuous blower-type duster for insecticidal materials. During the operation the blower is run at a speed ranging from 5,000 to 15,000 revolutions per minute. This duster is so designed that the large particles in a dust are returned to the blower by way of a circulating tube. In this way the large particles are disintegrated into smaller particles.

Formula for tank-mix nicotine-bentonite for codling moth control.--L. F. Steiner and R. F. Sazama, of the Division of Fruit Insect Investigations, and J. E. Fahey and H. W. Rusk, of this Division, have recently published E-428 (mimeographed), which describes the best method of preparing tank-mix nicotine-bentonite for control of the codling moth. The formula is as follows: Sodium lauryl sulphate, 1/2 ounce; nicotine sulphate (40-percent nicotine), 1 pint; Wyoming bentonite, 5 pounds; soybean oil, 1 quart; and water to make 100 gallons.

Hydrogenating pyrethrins diminishes their insecticidal value.--H. L. Haller, of this Division, and W. N. Sullivan, of the Division of Control Investigations, have reported (Jour. Econ. Ent., vol. 31, no.2, pp. 276-277, Apr. 1938) that when a pyrethrum concentrate rich in pyrethrin I is hydrogenated, the knock-down effect and also the mortality after 24 hours are greatly lessened. When a pyrethrum concentrate rich in pyrethrin II is similarly hydrogenated, the knock-down effect is diminished, but there is little change in the mortality after 24 hours. This mortality figure is low compared with that of pyrethrin I.

The complexity of calcium arsenate as revealed by chemical analysis of fractions of different particle size.--Mr. Goodhue and C. C. Cassil, of this Division, have reported that when commercial calcium arsenate is separated into fractions of different particle size by an air classifier the different fractions have different chemical composition. The fine particles contain more arsenically combined calcium oxide than do the coarse ones and, as a result, much less water-soluble arsenic. Their results are described in the Journal of Economic Entomology (vol. 31, no. 2, pp. 278-280. April 1938).

Some organic compounds found highly toxic to codling moth larvae.--L. E. Smith, of this Division, and E. H. Siegler and F. Munger, of the Division of Fruit Insect Investigations, have published a list of 20 synthetic organic compounds, all of which gave 50 percent or more fruit free from worms when tested by the apple-plug method (Jour. Econ. Ent., vol. 31, no. 2, pp. 322-323, April 1938). These workers were unable to find any simple relationship between chemical constitution and toxicity to insects of the organic compounds studied.

Toxicity of oxidized phenothiazine.--W. A. Gersdorff and H. V. Claborn, of this Division, have reported (Jour. Agr. Research, vol. 56, no. 4, pp. 277-282, Feb. 15, 1938) that phenothiazone (an oxidation product of phenothiazine) is about ten times as toxic to goldfish as is phenothiazine. Other oxidation products of phenothiazine, namely, phenothiazine sulphoxide and thionol, were not appreciably toxic to goldfish. Unpublished results by Mr. Siegler, of the Division of Fruit Insect Investigations, against codling moth larvae and by D. E. Fink, of the Division of Control Investigations, against mosquito larvae indicate that none of the oxidation products of phenothiazine are as toxic as phenothiazine.

A list of proprietary detergents, wetting agents, and emulsifying agents.--H. L. Cupples, of this Division, has compiled a list of the more generally used wetting agents (E-426 (mimeo.), 24 pp., April 1938). Information is given as to the manufacturer and the chemical and physical properties of each product. In addition, the surface tension, interfacial tension, and spreading coefficient of a 1-percent aqueous solution of each of these products are recorded.

Synthetic organic compounds toxic to mosquito larvae.--Mr. Fink, of the Division of Control Investigations, and L. E. Smith, D. L. Vivian, and H. V. Claborn, of this Division, have reported tests with 400 synthetic compounds against culicine mosquito larvae (E-425 (mimeo.), 34 pp., March 1938). Two hundred and twenty of these compounds proved effective enough to kill about 50 percent of the test insects in 16 hours at a concentration of 100 parts per million, and 23 were adjudged to be at least as toxic as rotenone. Phenothiazine was the most toxic of all compounds studied.

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BEE CULTURE

Spraying open pear blossoms may affect nectar secretion.--Geo. H. Vansell, of the Pacific States bee culture laboratory, raises the question whether the practice of spraying pears with bordeaux mixture or with lime sulphur to help in the control of fireblight does not interfere with nectar secretion by the blossoms. In connection with pollination studies on pears in Oregon he says of these sprays: "Evidence seemed clear that the caustic action from the spray practically stopped nectar secretion in the blossoms. After such spraying the blossoms appear dry, even during periods favorable to secretion in unsprayed blossoms. What effect, if any, this spraying may have on bees seeking pollen is not clear." He adds: "Pear petals, in the blossoms about to burst at the time of the above spray application, were burned so that they cling together over the stamens until after dehiscence. When such blossoms were forcibly opened by hand, nectar was found in them."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Additions to the National Collection.--Eight species of weevils, four species of lepidopterous larvae, and nine species of coleopterous larvae, hitherto not represented in the National Collection, have been received from P. C. Ting, of the California State Department of Agriculture. This material was received partly in exchange and partly as a gift.

Progress reported on special project in Hymenoptera.--B. D. Burks, assistant entomologist of the Illinois State Natural History Survey, who was given a temporary appointment as associate entomologist in the Division of Insect Identification for the purpose of working up a revision of the large and difficult genus Tetrastichus, of the superfamily Chalcidoidea, spent the period January 22 to April 21 in the Museum engaged in the preparation of such a revision. During that period Dr. Burks worked out the generic and specific synonymy, prepared a tentative key to the North American species of the genus, and assembled material of a number of new forms. Work on the project will be continued by Dr. Burks in his spare time at the laboratory of the Illinois State Natural History Survey and eventually the much-needed revision is expected to be published.

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